

SEQUENCE LISTING

<110> HSC RESEARCH AND DEVELOPMENT LIMITED PARTNERSHIP

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<130> 3206-169/PAR

<140> PCT/CA99/00375

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<150> 2,230,201

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Gln Leu Gln Glu Ser Gln Gln Met Leu Gly Arg Leu Ile Pro Glu Lys					
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cag cga gga gag cca gaa gct ttg tat gca gct gtg act aag aaa cct Gln Arg Gly Glu Pro Glu Ala Leu Tyr Ala Ala Val Thr Lys Lys Pro 915 920 925	2784
acc tcc aca gcc tat cca gtt acc tcc aca gcc tat cca gtt gga gaa Thr Ser Thr Ala Tyr Pro Val Thr Ser Thr Ala Tyr Pro Val Gly Glu 930 935 940	2832
gac tac att gca ctt tat tca tac tca agt gta gag ccc ggg gat ttg Asp Tyr Ile Ala Leu Tyr Ser Tyr Ser Val Glu Pro Gly Asp Leu 945 950 955 960	2880
act ttc act gaa ggt gaa gaa att cta gtg acc cag aaa gat gga gag Thr Phe Thr Glu Gly Glu Ile Leu Val Thr Gln Lys Asp Gly Glu 965 970 975	2928
tgg tgg aca gga agt att gga gag aga act gga atc ttc ccg tcc aac Trp Trp Thr Gly Ser Ile Gly Glu Arg Thr Gly Ile Phe Pro Ser Asn 980 985 990	2976
tac gtc aga cca aag gat caa gag aat ttt ggg aat gct agc aaa tct Tyr Val Arg Pro Lys Asp Gln Glu Asn Phe Gly Asn Ala Ser Lys Ser 995 1000 1005	3024
gga gca tca aac aaa aaa ccc gag atc gct caa gta act tca gca tat Gly Ala Ser Asn Lys Lys Pro Glu Ile Ala Gln Val Thr Ser Ala Tyr 1010 1015 1020	3072
gct gct tca ggg act gag cag ctc agc ctt gcg cca gga cag tta ata Ala Ala Ser Gly Thr Glu Gln Leu Ser Leu Ala Pro Gly Gln Leu Ile 1025 1030 1035 1040	3120
tta atc tta aag aaa aac aca agc ggg tgg tgg caa gga gag cta cag Leu Ile Leu Lys Lys Asn Thr Ser Gly Trp Trp Gln Gly Glu Leu Gln 1045 1050 1055	3168
gcc aga ggg aag aaa cga cag aag gga tgg ttt cct gcc agc cat gta Ala Arg Gly Lys Lys Arg Gln Lys Gly Trp Phe Pro Ala Ser His Val 1060 1065 1070	3216
aag ctg cta ggt cca agc agt gaa aga acc atg cct act ttt cac gct Lys Leu Leu Gly Pro Ser Ser Glu Arg Thr Met Pro Thr Phe His Ala 1075 1080 1085	3264
gta tgt caa gtg att gct atg tat gac tac atg gcg aat aac gaa gat Val Cys Gln Val Ile Ala Met Tyr Asp Tyr Met Ala Asn Asn Glu Asp 1090 1095 1100	3312
gag ctc aat ttc tcc aaa gga cag ctg att aat gtt atg aac aaa gat Glu Leu Asn Phe Ser Lys Gly Gln Leu Ile Asn Val Met Asn Lys Asp 1105 1110 1115 1120	3360

gac cct gac tgg tgg caa gga gaa acc aat ggt ctg act ggt ctc ttt		3408
Asp Pro Asp Trp Trp Gln Gly Glu Thr Asn Gly Leu Thr Gly Leu Phe		
1125	1130	1135
cct tca aac tat gtt aag atg aca aca gac tca gat cca agt caa cag		3456
Pro Ser Asn Tyr Val Lys Met Thr Thr Asp Ser Asp Pro Ser Gln Gln		
1140	1145	1150
tgg tgt gct gac ctc caa gcc ctg gac aca atg cag cct acg gag agg		3504
Trp Cys Ala Asp Leu Gln Ala Leu Asp Thr Met Gln Pro Thr Glu Arg		
1155	1160	1165
aag cga cag ggc tac att cac gag ctc att cag aca gag gag cgg tac		3552
Lys Arg Gln Gly Tyr Ile His Glu Leu Ile Gln Thr Glu Glu Arg Tyr		
1170	1175	1180
atg gac gac ctg caa ctt ttt gaa caa aaa act ctc ctt tga		3594
Met Asp Asp Leu Gln Leu Phe Glu Gln Lys Thr Leu Leu		
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Ile Thr Ser Glu Glu Arg Thr Lys His Asp Lys Gln Phe Asp Asn Leu		
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Lys Pro Ser Gly Gly Tyr Ile Thr Gly Asp Gln Ala Arg Thr Phe Phe		
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Leu Gln Ser Gly Leu Pro Ala Pro Val Leu Ala Glu Ile Trp Ala Leu		
50	55	60
Ser Asp Leu Asn Lys Asp Gly Lys Met Asp Gln Gln Glu Phe Ser Ile		
65	70	75
		80
Ala Met Lys Leu Ile Lys Leu Lys Leu Gln Gly Gln Gln Leu Pro Val		
85	90	95
Val Leu Pro Pro Ile Met Lys Gln Pro Pro Met Phe Ser Pro Leu Ile		
100	105	110
Ser Ala Arg Phe Gly Met Gly Ser Met Pro Asn Leu Ser Ile His Gln		
115	120	125
Pro Leu Pro Pro Val Ala Pro Ile Ala Thr Pro Leu Ser Ser Ala Thr		
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Ser Gly Thr Ser Ile Pro Pro Leu Met Met Pro Ala Pro Leu Val Pro		
145	150	155
		160
Ser Val Ser Thr Ser Ser Leu Pro Asn Gly Thr Ala Ser Leu Ile Gln		
165	170	175

Pro Leu Ser Ile Pro Tyr Ser Ser Ser Thr Leu Pro His Ala Ser Ser
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 Tyr Ser Leu Met Met Gly Gly Phe Gly Gly Ala Ser Ile Gln Lys Ala
 195 200 205
 Gln Ser Leu Ile Asp Leu Gly Ser Ser Ser Ser Thr Ser Ser Thr Ala
 210 215 220
 Ser Leu Ser Gly Asn Ser Pro Lys Thr Gly Thr Ser Glu Trp Ala Val
 225 230 235 240
 Pro Gln Pro Ser Arg Leu Lys Tyr Arg Gln Lys Phe Asn Ser Leu Asp
 245 250 255
 Lys Gly Met Ser Gly Tyr Leu Ser Gly Phe Gln Ala Arg Asn Ala Leu
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 Leu Gln Ser Asn Leu Ser Gln Thr Gln Leu Ala Thr Ile Trp Thr Leu
 275 280 285
 Ala Asp Ile Asp Gly Asp Gly Gln Leu Lys Ala Glu Glu Phe Ile Leu
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 Ala Met His Leu Thr Asp Met Ala Lys Ala Gly Gln Pro Leu Pro Leu
 305 310 315 320
 Thr Leu Pro Pro Glu Leu Val Pro Pro Ser Phe Arg Gly Gly Lys Gln
 325 330 335
 Val Asp Ser Val Asn Gly Thr Leu Pro Ser Tyr Gln Lys Thr Gln Glu
 340 345 350
 Glu Glu Pro Gln Lys Lys Leu Pro Val Thr Phe Glu Asp Lys Arg Lys
 355 360 365
 Ala Asn Tyr Glu Arg Gly Asn Met Glu Leu Glu Lys Arg Arg Gln Val
 370 375 380
 Leu Met Glu Gln Gln Arg Glu Ala Glu Arg Lys Ala Gln Lys Glu
 385 390 395 400
 Lys Glu Glu Trp Glu Arg Lys Gln Arg Glu Leu Gln Glu Gln Glu Trp
 405 410 415
 Lys Lys Gln Leu Glu Leu Glu Lys Arg Leu Glu Lys Gln Arg Glu Leu
 420 425 430
 Glu Arg Gln Arg Glu Glu Glu Arg Arg Lys Glu Ile Glu Arg Arg Glu
 435 440 445
 Ala Ala Lys Gln Glu Leu Glu Arg Gln Arg Arg Leu Glu Trp Glu Arg
 450 455 460
 Leu Arg Arg Gln Glu Leu Leu Ser Gln Lys Thr Arg Glu Gln Glu Asp
 465 470 475 480
 Ile Val Arg Leu Ser Ser Arg Lys Lys Ser Leu His Leu Glu Leu Glu
 485 490 495

Ala Val Asn Gly Lys His Gln Gln Ile Ser Gly Arg Leu Gln Asp Val
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 Gln Ile Arg Lys Gln Thr Gln Lys Thr Glu Leu Glu Val Leu Asp Lys
 515 520 525
 Gln Cys Asp Leu Glu Ile Met Glu Ile Lys Gln Leu Gln Gln Glu Leu
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 Lys Glu Tyr Gln Asn Lys Leu Ile Tyr Leu Val Pro Glu Lys Gln Leu
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 Leu Asn Glu Arg Ile Lys Asn Met Gln Leu Ser Asn Thr Pro Asp Ser
 565 570 575
 Gly Ile Ser Leu Leu His Lys Lys Ser Ser Glu Lys Glu Glu Leu Cys
 580 585 590
 Gln Arg Leu Lys Glu Gln Leu Asp Ala Leu Glu Lys Glu Thr Ala Ser
 595 600 605
 Lys Leu Ser Glu Met Asp Ser Phe Asn Asn Gln Leu Lys Glu Leu Arg
 610 615 620
 Glu Ser Tyr Asn Thr Gln Gln Leu Ala Leu Glu Gln Leu His Lys Ile
 625 630 635 640
 Lys Arg Asp Lys Leu Lys Glu Ile Glu Arg Lys Arg Leu Glu Gln Ile
 645 650 655
 Gln Lys Lys Lys Leu Glu Asp Glu Ala Ala Arg Lys Ala Lys Gln Gly
 660 665 670
 Lys Glu Asn Leu Trp Arg Glu Ser Ile Arg Lys Glu Glu Glu Lys
 675 680 685
 Gln Lys Arg Leu Gln Glu Glu Lys Ser Gln Asp Lys Thr Gln Glu Glu
 690 695 700
 Glu Arg Lys Ala Glu Ala Lys Gln Ser Glu Thr Ala Ser Ala Leu Val
 705 710 715 720
 Asn Tyr Arg Ala Leu Tyr Pro Phe Glu Ala Arg Asn His Asp Glu Met
 725 730 735
 Ser Phe Ser Ser Gly Asp Ile Ile Gln Val Asp Glu Lys Thr Val Gly
 740 745 750
 Glu Pro Gly Trp Leu Tyr Gly Ser Phe Gln Gly Lys Phe Gly Trp Phe
 755 760 765
 Pro Cys Asn Tyr Val Glu Lys Val Leu Ser Ser Glu Lys Ala Leu Ser
 770 775 780
 Pro Lys Lys Ala Leu Leu Pro Pro Thr Val Ser Leu Ser Ala Thr Ser
 785 790 795 800
 Thr Ser Ser Gln Pro Pro Ala Ser Val Thr Asp Tyr His Asn Val Ser
 805 810 815

Phe Ser Asn Leu Thr Val Asn Thr Thr Trp Gln Gln Lys Ser Ala Phe
 820 825 830
 Thr Arg Thr Val Ser Pro Gly Ser Val Ser Pro Ile His Gly Gln Gly
 835 840 845
 Gln Ala Val Glu Asn Leu Lys Ala Gln Ala Leu Cys Ser Trp Thr Ala
 850 855 860
 Lys Lys Glu Asn His Leu Asn Phe Ser Lys His Asp Val Ile Thr Val
 865 870 875 880
 Leu Glu Gln Gln Glu Asn Trp Trp Phe Gly Glu Val His Gly Gly Arg
 885 890 895
 Gly Trp Phe Pro Lys Ser Tyr Val Lys Leu Ile Pro Gly Asn Glu Val
 900 905 910
 Gln Arg Gly Glu Pro Glu Ala Leu Tyr Ala Ala Val Thr Lys Lys Pro
 915 920 925
 Thr Ser Thr Ala Tyr Pro Val Thr Ser Thr Ala Tyr Pro Val Gly Glu
 930 935 940
 Asp Tyr Ile Ala Leu Tyr Ser Tyr Ser Ser Val Glu Pro Gly Asp Leu
 945 950 955 960
 Thr Phe Thr Glu Gly Glu Glu Ile Leu Val Thr Gln Lys Asp Gly Glu
 965 970 975
 Trp Trp Thr Gly Ser Ile Gly Glu Arg Thr Gly Ile Phe Pro Ser Asn
 980 985 990
 Tyr Val Arg Pro Lys Asp Gln Glu Asn Phe Gly Asn Ala Ser Lys Ser
 995 1000 1005
 Gly Ala Ser Asn Lys Lys Pro Glu Ile Ala Gln Val Thr Ser Ala Tyr
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 Ala Ala Ser Gly Thr Glu Gln Leu Ser Leu Ala Pro Gly Gln Leu Ile
 1025 1030 1035 1040
 Leu Ile Leu Lys Lys Asn Thr Ser Gly Trp Trp Gln Gly Glu Leu Gln
 1045 1050 1055
 Ala Arg Gly Lys Lys Arg Gln Lys Gly Trp Phe Pro Ala Ser His Val
 1060 1065 1070
 Lys Leu Leu Gly Pro Ser Ser Glu Arg Thr Met Pro Thr Phe His Ala
 1075 1080 1085
 Val Cys Gln Val Ile Ala Met Tyr Asp Tyr Met Ala Asn Asn Glu Asp
 1090 1095 1100
 Glu Leu Asn Phe Ser Lys Gly Gln Leu Ile Asn Val Met Asn Lys Asp
 105 1110 1115 1120
 Asp Pro Asp Trp Trp Gln Gly Glu Thr Asn Gly Leu Thr Gly Leu Phe
 1125 1130 1135

Pro Ser Asn Tyr Val Lys Met Thr Thr Asp Ser Asp Pro Ser Gln Gln
1140 1145 1150

Trp Cys Ala Asp Leu Gln Ala Leu Asp Thr Met Gln Pro Thr Glu Arg
1155 1160 1165

Lys Arg Gln Gly Tyr Ile His Glu Leu Ile Gln Thr Glu Glu Arg Tyr
1170 1175 1180

Met Asp Asp Leu Gln Leu Phe Glu Gln Lys Thr Leu Leu
185 1190 1195

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<213> Mus musculus

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agaagaaaacg ggaaaaggct taccaagccc gttctaaaa gacttcaggat attggcgctc 180
tgatggtgca tgcattgaa gctacagaat taaaagcctg caaaccaaac gggaaaagta 240
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caactaaaccc caagtggAAC ttcaactgcc agttcttcat caaggatctt taccaggacg 360
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gactactact gcacgaagtc cccactggag aagtctgggt ccgcttgac ctgcaacttt 540
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aggctgggtc taaagacaga ttttgctctc ccaggacaga ggagcatcac atggcttcat 660
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tatgcaaaca tgatcttt 738

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<211> 186
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<213> Mus musculus

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20 25 30

Glu Gln Tyr Ile Asp Thr Glu Lys Lys Lys Arg Glu Lys Ala Tyr Gln
35 40 45

Ala Arg Ser Gln Lys Thr Ser Gly Ile Gly Arg Leu Met Val His Val
 50 55 60
 Ile Glu Ala Thr Glu Leu Lys Ala Cys Lys Pro Asn Gly Lys Ser Asn
 65 70 75 80
 Pro Tyr Cys Glu Val Ser Met Gly Ser Gln Ser Tyr Thr Thr Arg Thr
 85 90 95
 Leu Gln Asp Thr Leu Asn Pro Lys Trp Asn Phe Asn Cys Gln Phe Phe
 100 105 110
 Ile Lys Asp Leu Tyr Gln Asp Val Leu Cys Leu Thr Met Phe Asp Arg
 115 120 125
 Asp Gln Phe Ser Pro Asp Asp Phe Leu Gly Arg Thr Glu Val Pro Val
 130 135 140
 Ala Lys Ile Arg Thr Glu Gln Glu Ser Lys Gly Pro Thr Thr Arg Arg
 145 150 155 160
 Leu Leu Leu His Glu Val Pro Thr Gly Glu Val Trp Val Arg Phe Asp
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 Leu Gln Leu Phe Glu Gln Lys Thr Leu Leu
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 <211> 1078
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 tttaagccca gccagaaagg ctttcagga ggaaccaagt cttcatgga ctttggcagc 180
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<211> 309
<212> PRT
<213> Mus musculus

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Gly Leu Gly Lys Asn Ala Gln Gly Ile Ile Asn Pro Ile Glu Ala Lys
35 40 45
Gln Arg Lys Gly Lys Gly Ala Val Gly Ala Tyr Gly Ser Glu Arg Thr
50 55 60
Thr Gln Ser Leu Gln Asp Phe Pro Val Ala Asp Ser Glu Glu Ala
65 70 75 80
Glu Glu Glu Phe Gln Lys Glu Leu Ser Gln Trp Arg Lys Asp Pro Ser
85 90 95
Gly Ser Lys Lys Pro Lys Tyr Ser Tyr Lys Thr Val Glu Glu Leu
100 105 110
Lys Ala Lys Gly Arg Val Ser Lys Lys Leu Thr Ala Pro Gln Lys Glu
115 120 125
Leu Ser Gln Val Lys Val Ile Asp Met Thr Gly Arg Glu Gln Lys Val
130 135 140
Tyr Tyr Ser Tyr Ser Gln Ile Ser His Lys His Ser Val Pro Asp Glu
145 150 155 160
Gly Val Pro Leu Leu Ala Gln Leu Pro Pro Thr Ala Gly Lys Glu Ala
165 170 175
Arg Met Pro Gly Phe Ala Leu Pro Glu Leu Glu His Asn Leu Gln Leu
180 185 190
Leu Ile Glu Arg Thr Glu Gln Glu Ile Ile Gln Ser Asp Arg Gln Leu
195 200 205
Gln Tyr Glu Arg Asp Met Val Val Ser Leu Ser His Glu Leu Glu Lys
210 215 220

Thr Ala Glu Val Leu Ala His Glu Glu Arg Val Ile Ser Asn Leu Ser
225 230 235 240

Lys Val Leu Ala Leu Val Glu Glu Cys Glu Arg Arg Met Gln Pro His
245 250 255

Gly Thr Asp Pro Leu Thr Leu Asp Glu Cys Ala Arg Ile Phe Glu Thr
260 265 270

Leu Gln Asp Lys Tyr Tyr Glu Glu Tyr Arg Leu Ala Asp Arg Ala Asp
275 280 285

Leu Ala Val Ala Ile Val Tyr Pro Leu Val Lys Asp Tyr Phe Lys Asp
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Trp His Pro Ser Arg
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<210> 11

<211> 97

<212> DNA

<213> Mus musculus

<400> 11

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<210> 12

<211> 123

<212> DNA

<213> Mus musculus

<400> 12

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<210> 13

<211> 140

<212> DNA

<213> Mus musculus

<400> 13

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gtctctctgc tggactatgg 140

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<211> 2855

<212> DNA

<213> Mus musculus

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<211> 1151
<212> DNA
<213> Mus musculus

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1151

<210> 16
<211> 382
<212> PRT
<213> Mus musculus

<400> 16
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35 40 45

Ser Ala Asn Pro Ala Lys Thr Met Gln Gly Ser Glu Val Val Ser Val
50 55 60

Leu Lys Ser Leu Leu Ser Asn Leu Asp Glu Ile Lys Lys Glu Arg Glu
65 70 75 80

Ser Leu Glu Asn Asp Leu Lys Ser Val Asn Phe Asp Met Thr Ser Lys
85 90 95

Phe Leu Thr Ala Leu Ala Gln Asp Gly Val Ile Asn Glu Glu Ala Leu
100 105 110

Ser Val Thr Glu Leu Asp Arg Ile Tyr Gly Gly Leu Thr Ser Lys Val
115 120 125

Gln Glu Ser Leu Lys Lys Gln Glu Gly Leu Leu Lys Asn Ile Gln Val
130 135 140

Ser His Gln Glu Phe Ser Lys Met Lys Gln Ser Asn Asn Glu Ala Asn

145	150	155	160
Leu Arg Glu Glu Val Leu Lys Asn Leu Ala Thr Ala Tyr Asp Asn Phe			
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Val Glu Leu Val Ala Asn Leu Lys Glu Gly Thr Lys Phe Tyr Asn Glu			
180	185	190	
Leu Thr Glu Ile Leu Val Arg Phe Gln Asn Lys Cys Ser Asp Ile Val			
195	200	205	
Phe Ala Arg Lys Thr Glu Arg Asp Glu Leu Leu Lys Asp Leu Gln Gln			
210	215	220	
Ser Ile Ala Arg Glu Pro Ser Ala Pro Ser Ile Pro Pro Pro Ala Tyr			
225	230	235	240
Gln Ser Ser Pro Ala Ala Gly His Ala Ala Ala Pro Pro Pro Thr Pro Ala			
245	250	255	
Pro Arg Thr Met Pro Pro Ala Lys Pro Gln Pro Pro Ala Arg Pro Pro			
260	265	270	
Pro Pro Val Leu Pro Ala Asn Arg Val Pro Pro Ala Ser Ala Ala Ala			
275	280	285	
Ala Pro Ala Gly Val Gly Thr Ala Ser Ala Ala Pro Pro Gln Thr Pro			
290	295	300	
Gly Ser Ala Pro Pro Pro Gln Ala Gln Gly Pro Pro Tyr Pro Thr Tyr			
305	310	315	320
Pro Gly Tyr Pro Gly Tyr Cys Gln Met Pro Met Pro Met Gly Tyr Asn			
325	330	335	
Pro Tyr Ala Tyr Gly Gln Tyr Asn Met Pro Tyr Pro Pro Val Tyr His			
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Gln Ser Pro Gly Gln Ala Pro Tyr Pro Gly Pro Gln Gln Pro Thr Tyr			
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<211> 1738
<212> DNA
<213> Mus musculus

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<210> 18
<211> 1521
<212> DNA
<213> Mus musculus

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gccaagtgc tgccagccgt cccgcccaga gtctcaggcc cacccccgaa ccctccaccc 180
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gtgcctgccc gcagccctca ccccccagcgc cttctctggc acccccttcac tgtcccstgc 420
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tcgacccctt gtgcagtgac ccggatggtg ccccacccac acatgaagca cccacagctc 540
agctgccacc ctaggcaact cctccggttt cctatcactc tgctcctgac ccgggaggtg 600
agaacaggaa gcccagcctt cagctccctt gggagttcc agcctccctc ttaaaggcca 660
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acgcccacag gattcccatt aggtttaaa gtctttcca gagtccgctg gttccctcc 780
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<211> 720
<212> DNA
<213> Mus musculus

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<211> 801
<212> DNA
<213> Mus musculus

<400> 20
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<210> 21
<211> 119
<212> DNA
<213> Mus musculus

<400> 21
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<210> 22
 <211> 5738
 <212> DNA
 <213> Mus musculus

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 <212> DNA
 <213> Mus musculus

<220>
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aag ccg ata gcg gga ttt att act ggt gat caa gcg agg aac ttt ttt Lys Pro Ile Ala Gly Phe Ile Thr Gly Asp Gln Ala Arg Asn Phe Phe 35 40 45	144
ttc caa tct ggg tta cct cag cct gtc tta gca caa ata tgg gcg cta Phe Gln Ser Gly Leu Pro Gln Pro Val Leu Ala Gln Ile Trp Ala Leu 50 55 60	192
gcg gac atg aat aac gat gga agg atg gat caa gtg gaa ttt tcc ata Ala Asp Met Asn Asn Asp Gly Arg Met Asp Gln Val Glu Phe Ser Ile 65 70 75 80	240
gcc atg aag ctt atc aaa ctg aag cta caa gga tat cag ctc ccc tcc Ala Met Lys Leu Ile Lys Leu Lys Leu Gln Gly Tyr Gln Leu Pro Ser 85 90 95	288

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Thr Leu Pro Pro Val Met Lys Gln Gln Pro Val Ala Ile Ser Ser Ala			
100	105	110	
cca gca ttt ggt ata gga ggg att gct agc atg cca cca ctc aca gct		384	
Pro Ala Phe Gly Ile Gly Gly Ile Ala Ser Met Pro Pro Leu Thr Ala			
115	120	125	
gtt gct cct gtg cca atg ggc tcc att cca gtt gtt gga atg tct cca		432	
Val Ala Pro Val Pro Met Gly Ser Ile Pro Val Val Gly Met Ser Pro			
130	135	140	
ccc tta gta tct tct gtc cct cca gca gca gtg cct ccc ctg gct aac		480	
Pro Leu Val Ser Ser Val Pro Pro Ala Ala Val Pro Pro Leu Ala Asn			
145	150	155	160
ggg gct cct ccc gtc ata cag cct ctg cct gcg ttt gcg cat cct gca		528	
Gly Ala Pro Pro Val Ile Gln Pro Leu Pro Ala Phe Ala His Pro Ala			
165	170	175	
gcc aca tgg cca aag agt tct tcc agc aga tct ggt cca ggg tca		576	
Ala Thr Trp Pro Lys Ser Ser Ser Phe Ser Arg Ser Gly Pro Gly Ser			
180	185	190	
caa tta aac act aag tta cag aag gca caa tca ttc gat gtc gcc agc		624	
Gln Leu Asn Thr Lys Leu Gln Lys Ala Gln Ser Phe Asp Val Ala Ser			
195	200	205	
gcc cct cca gca gca gaa tgg gct gtg cct cag tca tca agg ctg aaa		672	
Ala Pro Pro Ala Ala Glu Trp Ala Val Pro Gln Ser Ser Arg Leu Lys			
210	215	220	
tac agg cag tta ttc aac agc cac gac aaa act atg agt gga cac tta		720	
Tyr Arg Gln Leu Phe Asn Ser His Asp Lys Thr Met Ser Gly His Leu			
225	230	235	240
aca ggt ccc cag gca aga act att ctc atg caa tca agt tta ccc cag		768	
Thr Gly Pro Gln Ala Arg Thr Ile Leu Met Gln Ser Ser Leu Pro Gln			
245	250	255	
gct cag ctg gct tca ata tgg aat ctt tct gac att gat caa gat gga		816	
Ala Gln Leu Ala Ser Ile Trp Asn Leu Ser Asp Ile Asp Gln Asp Gly			
260	265	270	
aaa ctc act gca gaa gaa ttt atc cta gct atg cac cta att gat gtt		864	
Lys Leu Thr Ala Glu Glu Phe Ile Leu Ala Met His Leu Ile Asp Val			
275	280	285	
gcc atg tct ggt cag cca ctg ccg ccc gtc ctg cct cca gaa tac atc		912	
Ala Met Ser Gly Gln Pro Leu Pro Pro Val Leu Pro Pro Glu Tyr Ile			
290	295	300	
cct cct tcc ttc aga aga gtt cgc tcc ggc agt ggg atg tcc gtc ata		960	
Pro Pro Ser Phe Arg Arg Val Arg Ser Gly Ser Gly Met Ser Val Ile			
305	310	315	320
agc tct tct gtg gat cag agg ctg cct gag gag ccg tcg tca gag		1008	
Ser Ser Ser Ser Val Asp Gln Arg Leu Pro Glu Glu Pro Ser Ser Glu			
325	330	335	

gat gag cag cag cca gag aag aaa ctg cct gtg aca ttt gaa gat aag		1056	
Asp Glu Gln Gln Pro Glu Lys Lys Leu Pro Val Thr Phe Glu Asp Lys			
340	345	350	
aag cgg gag aac ttc gag cga ggc agt gtg gag ctg gag aag cgc cgg		1104	
Lys Arg Glu Asn Phe Glu Arg Gly Ser Val Glu Leu Glu Lys Arg Arg			
355	360	365	
caa gcg ctc ttg gag cag cag cgc aaa gag cag gag cgg ttg gct cag		1152	
Gln Ala Leu Leu Glu Gln Gln Arg Lys Glu Gln Glu Arg Leu Ala Gln			
370	375	380	
ctg gag cgc gcc gag cag gag agg aaa gag cgg gag cgc cag gag cag		1200	
Leu Glu Arg Ala Glu Gln Glu Arg Lys Glu Arg Glu Arg Gln Glu Gln			
385	390	395	400
gag gcc aag cgg cag ctg gag ctg gag aag cag ctg gag aag cag cgg		1248	
Glu Ala Lys Arg Gln Leu Glu Leu Glu Lys Gln Leu Glu Lys Gln Arg			
405	410	415	
gag ctg gag cgg cag cga gag gag gag agg aag gag atc gag agg		1296	
Glu Leu Glu Arg Gln Arg Glu Glu Glu Arg Arg Lys Glu Ile Glu Arg			
420	425	430	
cgc gag gcc gca aaa cgg gaa ctg gaa agg cag cga caa ctt gaa tgg		1344	
Arg Glu Ala Ala Lys Arg Glu Leu Glu Arg Gln Arg Gln Leu Glu Trp			
435	440	445	
gaa cgg aac cgg aga cag gaa ctc ctg aat cag agg aac aag gag cag		1392	
Glu Arg Asn Arg Arg Gln Glu Leu Leu Asn Gln Arg Asn Lys Glu Gln			
450	455	460	
gag ggc acc gtg gtc ctg aag gca agg agg aag act ctg gag ttt gag		1440	
Glu Gly Thr Val Val Leu Lys Ala Arg Arg Lys Thr Leu Glu Phe Glu			
465	470	475	480
tta gaa gct ctg aat gac aaa aag cat cag cta gaa gga aaa ctt cag		1488	
Leu Glu Ala Leu Asn Asp Lys Lys His Gln Leu Glu Gly Lys Leu Gln			
485	490	495	
gat atc agg tgt cga ctg gca acc cag agg caa gaa att gag agc acg		1536	
Asp Ile Arg Cys Arg Leu Ala Thr Gln Arg Gln Glu Ile Glu Ser Thr			
500	505	510	
aac aag tct aga gag cta aga att gct gaa atc acc cac tta cag cag		1584	
Asn Lys Ser Arg Glu Leu Arg Ile Ala Glu Ile Thr His Leu Gln Gln			
515	520	525	
cag ttg cag gaa tct cag caa atg ctt gga aga ctt att cca gag aaa		1632	
Gln Leu Gln Glu Ser Gln Gln Met Leu Gly Arg Leu Ile Pro Glu Lys			
530	535	540	
cag ata ctc agt gac cag tta aaa caa gtc cag cag aac agt ttg cat		1680	
Gln Ile Leu Ser Asp Gln Leu Lys Gln Val Gln Gln Asn Ser Leu His			
545	550	555	560
aga gac tcg ctt ctt acc ctc aaa aga gcc ttg gaa gca aag gag ctg		1728	
Arg Asp Ser Leu Leu Thr Leu Lys Arg Ala Leu Glu Ala Lys Glu Leu			
565	570	575	

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Ala	Arg	Gln	Gln	Leu	Arg	Glu	Gln	Leu	Asp	Glu	Val	Glu	Arg	Glu	Thr	
580								585							590	
agg	tca	aag	ctg	cag	gag	att	gat	gtt	ttc	aac	aac	cag	ctg	aag	gaa	1824
Arg	Ser	Lys	Leu	Gln	Glu	Ile	Asp	Val	Phe	Asn	Asn	Gln	Leu	Lys	Glu	
595								600							605	
ctg	aga	gag	ata	cat	agc	aaa	cag	caa	ctc	cag	aag	cag	agg	tcc	ctg	1872
Leu	Arg	Glu	Ile	His	Ser	Lys	Gln	Gln	Leu	Gln	Lys	Gln	Arg	Ser	Leu	
610								615							620	
gag	gca	gcg	cga	ctg	aag	cag	aaa	gag	cag	gag	agg	aag	agc	ctg	gag	1920
Glu	Ala	Ala	Arg	Leu	Lys	Gln	Lys	Glu	Gln	Glu	Arg	Lys	Ser	Leu	Glu	
625								630							640	
tta	gag	aag	caa	aag	gaa	gac	gct	cag	aga	cga	gtt	cag	gaa	agg	gac	1968
Leu	Glu	Lys	Gln	Lys	Glu	Asp	Ala	Gln	Arg	Arg	Val	Gln	Glu	Arg	Asp	
645								650							655	
aag	caa	tgg	ctg	gag	cat	gtg	cag	cag	gag	gag	cag	cca	cg	ccc	cg	2016
Lys	Gln	Trp	Leu	Glu	His	Val	Gln	Gln	Glu	Glu	Gln	Pro	Arg	Pro	Arg	
660								665							670	
aaa	ccc	cac	gag	gag	gac	aga	ctg	aag	agg	gaa	gac	agt	gtc	agg	aag	2064
Lys	Pro	His	Glu	Glu	Asp	Arg	Leu	Lys	Arg	Glu	Asp	Ser	Val	Arg	Lys	
675								680							685	
aag	gag	gcg	gaa	gag	aga	gcc	aag	ccg	gaa	atg	caa	gac	aag	cag	agt	2112
Lys	Glu	Ala	Glu	Arg	Ala	Lys	Pro	Glu	Met	Gln	Asp	Lys	Gln	Ser		
690								695							700	
cgg	ctt	tcc	cat	ccg	cat	cag	gag	cca	gct	aag	ctg	gcc	acc	cag	gca	2160
Arg	Leu	Phe	His	Pro	His	Gln	Glu	Pro	Ala	Lys	Leu	Ala	Thr	Gln	Ala	
705								710							720	
ccc	tgg	tct	acc	aca	gag	aaa	ggc	ccg	ctt	acc	att	tct	gca	cag	gag	2208
Pro	Trp	Ser	Thr	Thr	Glu	Lys	Gly	Pro	Leu	Thr	Ile	Ser	Ala	Gln	Glu	
725								730							735	
agt	gta	aaa	gtg	gta	tat	tac	cga	g	ctg	tac	ccc	ttt	gaa	tcc	aga	2256
Ser	Val	Lys	Val	Val	Tyr	Tyr	Arg	Ala	Leu	Tyr	Pro	Phe	Glu	Ser	Arg	
740								745							750	
agt	cac	gat	gag	atc	acc	atc	cag	cca	gga	gat	ata	gtc	atg	gtg	gat	2304
Ser	His	Asp	Glu	Ile	Thr	Ile	Gln	Pro	Gly	Asp	Ile	Val	Met	Val	Asp	
755								760							765	
gaa	agc	cag	act	gga	gag	cca	gga	tgg	ctt	gga	gga	gag	ctg	aaa	ggg	2352
Glu	Ser	Gln	Thr	Gly	Glu	Pro	Gly	Trp	Leu	Gly	Gly	Glu	Leu	Lys	Gly	
770								775							780	
aag	acg	gga	tgg	tcc	cct	gca	aac	tat	gca	gaa	aag	att	cca	gaa	aat	2400
Lys	Thr	Gly	Trp	Phe	Pro	Ala	Asn	Tyr	Ala	Glu	Lys	Ile	Pro	Glu	Asn	
785								790							800	
gag	gtt	ccc	act	cca	gcc	aaa	cca	gtg	acc	gat	ctg	aca	tct	gcc	cct	2448
Glu	Val	Pro	Thr	Pro	Ala	Lys	Pro	Val	Thr	Asp	Leu	Thr	Ser	Ala	Pro	
805								810							815	

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acg tgg ccc agc agc tca aac gag aag cca gaa acg gac aac tgg gat Thr Trp Pro Ser Ser Asn Glu Lys Pro Glu Thr Asp Asn Trp Asp 850 855 860	2592
acg tgg gcg gct cag cct tct ctg acc gta cct agt gct ggc cag tta Thr Trp Ala Ala Gln Pro Ser Leu Thr Val Pro Ser Ala Gly Gln Leu 865 870 875 880	2640
cgg cag aga tca gcc ttt acc cca gcc aca gcc act ggc tcc tcc cca Arg Gln Arg Ser Ala Phe Thr Pro Ala Thr Ala Thr Gly Ser Ser Pro 885 890 895	2688
tct ccc gtc ctg ggc cag ggt gaa aag gtg gaa ggg cta caa gcg caa Ser Pro Val Leu Gly Gln Gly Glu Lys Val Glu Gly Leu Gln Ala Gln 900 905 910	2736
gcc ctg tat ccc tgg aga gcc aaa aaa gac aac cac tta aat ttt aac Ala Leu Tyr Pro Trp Arg Ala Lys Lys Asp Asn His Leu Asn Phe Asn 915 920 925	2784
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ctc att tca ggg ccc gta agg aaa tcc aca agc atc gat act ggc cct Leu Ile Ser Gly Pro Val Arg Lys Ser Thr Ser Ile Asp Thr Gly Pro 965 970 975	2928
act gaa agt cct gct agt cta aag aga gtg gct tcc ccg gcc gcc aag Thr Glu Ser Pro Ala Ser Leu Lys Arg Val Ala Ser Pro Ala Ala Lys 980 985 990	2976
cca gcc att ccc gga gaa gag ttt att gcc atg tac aca tac gag agt Pro Ala Ile Pro Gly Glu Phe Ile Ala Met Tyr Thr Tyr Glu Ser 995 1000 1005	3024
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cag gtt att gct tcc tac gct gct act ggt ccc gaa caa ctc acc ctg Gln Val Ile Ala Ser Tyr Ala Ala Thr Gly Pro Glu Gln Leu Thr Leu	1075	1080	1085	3264
gct cct ggg cag ctg att ctg atc cg ^g aaa aag aac cca ggt gga tgg Ala Pro Gly Gln Leu Ile Leu Ile Arg Lys Lys Asn Pro Gly Gly Trp	1090	1095	1100	3312
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acc cca act gag cta ccc aag acc gca gtg cag cca gca gtg tgc cag Thr Pro Thr Glu Leu Pro Lys Thr Ala Val Gln Pro Ala Val Cys Gln	1140	1145	1150	3456
gtg atc ggg atg tac gat tac acc gcc cag aac gat gac gaa cta gcc Val Ile Gly Met Tyr Asp Tyr Thr Ala Gln Asn Asp Asp Glu Leu Ala	1155	1160	1165	3504
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tgg tgg aaa gga gaa gtc agt ggg caa gtt ggg ctc ttc cca tcc aat Trp Trp Lys Gly Glu Val Ser Gly Gln Val Gly Leu Phe Pro Ser Asn	1185	1190	1195	3600
tat gta aag ctg acc aca gac atg gac ccc agc cag caa tgg tgc tca Tyr Val Lys Leu Thr Thr Asp Met Asp Pro Ser Gln Gln Trp Cys Ser	1205	1210	1215	3648
gac ctg cat ctc tta gat atg ctg acc ccg act gag agg aag cgg caa Asp Leu His Leu Leu Asp Met Leu Thr Pro Thr Glu Arg Lys Arg Gln	1220	1225	1230	3696
ggc tac atc cat gaa ctc att gtc acg gag gag aac tac gtg aac gac Gly Tyr Ile His Glu Leu Ile Val Thr Glu Glu Asn Tyr Val Asn Asp	1235	1240	1245	3744
ttg cag ctg gtc aca gag atc ttt cag aaa ccc ctg acg gag tct gag Leu Gln Leu Val Thr Glu Ile Phe Gln Lys Pro Leu Thr Glu Ser Glu	1250	1255	1260	3792
ctg ctg aca gaa aaa gag gtt gct atg att ttt gtt aac tgg aag gag Leu Leu Thr Glu Lys Glu Val Ala Met Ile Phe Val Asn Trp Lys Glu	1265	1270	1275	3840
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 Phe Gln Ser Gly Leu Pro Gln Pro Val Leu Ala Gln Ile Trp Ala Leu
 50 55 60
 Ala Asp Met Asn Asn Asp Gly Arg Met Asp Gln Val Glu Phe Ser Ile
 65 70 75 80
 Ala Met Lys Leu Ile Lys Leu Lys Leu Gln Gly Tyr Gln Leu Pro Ser
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 Thr Leu Pro Pro Val Met Lys Gln Gln Pro Val Ala Ile Ser Ser Ala
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 Pro Ala Phe Gly Ile Gly Gly Ile Ala Ser Met Pro Pro Leu Thr Ala
 115 120 125
 Val Ala Pro Val Pro Met Gly Ser Ile Pro Val Val Gly Met Ser Pro
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 Pro Leu Val Ser Ser Val Pro Pro Ala Ala Val Pro Pro Leu Ala Asn
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 Gly Ala Pro Pro Val Ile Gln Pro Leu Pro Ala Phe Ala His Pro Ala
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 Ala Thr Trp Pro Lys Ser Ser Ser Phe Ser Arg Ser Gly Pro Gly Ser
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 Gln Leu Asn Thr Lys Leu Gln Lys Ala Gln Ser Phe Asp Val Ala Ser
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 Ala Pro Pro Ala Ala Glu Trp Ala Val Pro Gln Ser Ser Arg Leu Lys
 210 215 220
 Tyr Arg Gln Leu Phe Asn Ser His Asp Lys Thr Met Ser Gly His Leu
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 Thr Gly Pro Gln Ala Arg Thr Ile Leu Met Gln Ser Ser Leu Pro Gln
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 Ala Met Ser Gly Gln Pro Leu Pro Pro Val Leu Pro Pro Glu Tyr Ile
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 Pro Pro Ser Phe Arg Arg Val Arg Ser Gly Ser Gly Met Ser Val Ile
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Lys Leu Ser Glu Met Asp Ser Phe Asn Asn Gln Leu Lys Glu Leu Arg			
610	615	620	
gaa agc tat aat aca cag cag tta gcc ctt gaa caa ctt cat aaa atc			1920
Glu Ser Tyr Asn Thr Gln Gln Leu Ala Leu Glu Gln Leu His Lys Ile			
625	630	635	640
aaa cgt gac aaa ttg aag gaa atc gaa aga aaa aga tta gag caa att			1968
Lys Arg Asp Lys Leu Lys Glu Ile Glu Arg Lys Arg Leu Glu Gln Ile			
645	650	655	
caa aaa aag aaa cta gaa gat gag gct gca agg aaa gca aag caa gga			2016
Gln Lys Lys Leu Glu Asp Glu Ala Ala Arg Lys Ala Lys Gln Gly			
660	665	670	
aaa gaa aac ttg tgg aga gaa agt att aga aag gaa gaa gag gaa aag			2064
Lys Glu Asn Leu Trp Arg Glu Ser Ile Arg Lys Glu Glu Glu Lys			
675	680	685	
caa aaa cga ctc cag gaa aag tca cag gac aaa act caa gaa gag			2112
Gln Lys Arg Leu Gln Glu Lys Ser Gln Asp Lys Thr Gln Glu Glu			
690	695	700	
gaa cga aaa gct gag gca aaa caa agt gag aca gcc agt gct ttg gtg			2160
Glu Arg Lys Ala Glu Ala Lys Gln Ser Glu Thr Ala Ser Ala Leu Val			
705	710	715	720
aat tac aga gca ctg tac cct ttt gaa gca aga aac cat gat gag atg			2208

Asn Tyr Arg Ala Leu Tyr Pro Phe Glu Ala Arg Asn His Asp Glu Met			
725	730	735	
agt ttt agt tct ggg gat ata att cag gtt gat gaa aaa act gta gga			2256
Ser Phe Ser Ser Gly Asp Ile Ile Gln Val Asp Glu Lys Thr Val Gly			
740	745	750	
gag cct ggt tgg ctt tat ggt agt ttt cag gga aag ttt ggc tgg ttc			2304
Glu Pro Gly Trp Leu Tyr Gly Ser Phe Gln Gly Lys Phe Gly Trp Phe			
755	760	765	
ccc tgc aac tat gta gaa aaa gtg ctg tca agt gaa aaa gct ctg tct			2352
Pro Cys Asn Tyr Val Glu Lys Val Leu Ser Ser Glu Lys Ala Leu Ser			
770	775	780	
cct aag aag gcc tta ctt cct cct aca gtg tct ctc tct gct acc tca			2400
Pro Lys Lys Ala Leu Leu Pro Pro Thr Val Ser Leu Ser Ala Thr Ser			
785	790	795	800
act tct tcc cag cca cca gca tca gtg act gat tat cac aat gta tcc			2448
Thr Ser Ser Gln Pro Pro Ala Ser Val Thr Asp Tyr His Asn Val Ser			
805	810	815	
tcc tca aac ctt act gtt aat aca aca tgg cag cag aag tca gct ttt			2496
Phe Ser Asn Leu Thr Val Asn Thr Thr Trp Gln Gln Lys Ser Ala Phe			
820	825	830	
acc cgc act gtg tcc cct gga tct gtg tcc ccc att cac gga cag ggg			2544
Thr Arg Thr Val Ser Pro Gly Ser Val Ser Pro Ile His Gly Gln Gly			
835	840	845	
cag gct gta gaa aac ctg aaa gcc cag gcc ctt tgt tcc tgg acg gca			2592
Gln Ala Val Glu Asn Leu Lys Ala Gln Ala Leu Cys Ser Trp Thr Ala			
850	855	860	
aag aag gag aac cac ctg aac ttc tca aag cac gac gtc atc act gtc			2640
Lys Lys Glu Asn His Leu Asn Phe Ser Lys His Asp Val Ile Thr Val			
865	870	875	880
ctg gag cag cag gaa aac tgg tgg ttt ggg gag gtg cac gga gga aga			2688
Leu Glu Gln Glu Asn Trp Trp Phe Gly Glu Val His Gly Gly Arg			
885	890	895	
gga tgg ttc ccc aag tct tat gtc aag ctc att cct ggg aat gaa gta			2736
Gly Trp Phe Pro Lys Ser Tyr Val Lys Leu Ile Pro Gly Asn Glu Val			
900	905	910	
cag cga gga gag cca gaa gct ttg tat gca gct gtg act aag aaa cct			2784
Gln Arg Gly Glu Pro Glu Ala Leu Tyr Ala Ala Val Thr Lys Lys Pro			
915	920	925	
acc tcc aca gcc tat cca gtt acc tcc aca gcc tat cca gtt gga gaa			2832
Thr Ser Thr Ala Tyr Pro Val Thr Ser Thr Ala Tyr Pro Val Gly Glu			
930	935	940	
gac tac att gca ctt tat tca tac tca agt gta gag ccc ggg gat ttg			2880
Asp Tyr Ile Ala Leu Tyr Ser Tyr Ser Ser Val Glu Pro Gly Asp Leu			
945	950	955	960
act ttc act gaa ggt gaa gaa att cta gtg acc cag aaa gat gga gag			2928

Thr Phe Thr Glu Gly Glu Glu Ile Leu Val Thr Gln Lys Asp Gly Glu			
965	970	975	
tgg tgg aca gga agt att gga gag aga act gga atc ttc ccg tcc aac			2976
Trp Trp Thr Gly Ser Ile Gly Glu Arg Thr Gly Ile Phe Pro Ser Asn			
980	985	990	
tac gtc aga cca aag gat caa gag aat ttt ggg aat gct agc aaa tct			3024
Tyr Val Arg Pro Lys Asp Gln Glu Asn Phe Gly Asn Ala Ser Lys Ser			
995	1000	1005	
gga gca tca aac aaa aaa ccc gag atc gct caa gta act tca gca tat			3072
Gly Ala Ser Asn Lys Lys Pro Glu Ile Ala Gln Val Thr Ser Ala Tyr			
1010	1015	1020	
gct gct tca ggg act gag cag ctc agc ctt gcg cca gga cag tta ata			3120
Ala Ala Ser Gly Thr Glu Gln Leu Ser Leu Ala Pro Gly Gln Leu Ile			
1025	1030	1035	1040
tta atc tta aag aaa aac aca agc ggg tgg tgg caa gga gag cta cag			3168
Leu Ile Leu Lys Lys Asn Thr Ser Gly Trp Trp Gln Gly Glu Leu Gln			
1045	1050	1055	
gcc aga ggg aag aaa cga cag aag gga tgg ttt cct gcc agc cat gta			3216
Ala Arg Gly Lys Lys Arg Gln Lys Gly Trp Phe Pro Ala Ser His Val			
1060	1065	1070	
aag ctg cta ggt cca agc agt gaa aga acc atg cct act ttt cac gct			3264
Lys Leu Leu Gly Pro Ser Ser Glu Arg Thr Met Pro Thr Phe His Ala			
1075	1080	1085	
gta tgt caa gtg att gct atg tat gac tac atg gcg aat aac gaa gat			3312
Val Cys Gln Val Ile Ala Met Tyr Asp Tyr Met Ala Asn Asn Glu Asp			
1090	1095	1100	
gag ctc aat ttc tcc aaa gga cag ctg att aat gtt atg aac aaa gat			3360
Glu Leu Asn Phe Ser Lys Gly Gln Leu Ile Asn Val Met Asn Lys Asp			
1105	1110	1115	1120
gac cct gac tgg tgg caa gga gaa acc aat ggt ctg act ggt ctc ttt			3408
Asp Pro Asp Trp Trp Gln Gly Glu Thr Asn Gly Leu Thr Gly Leu Phe			
1125	1130	1135	
cct tca aac tat gtt aag atg aca aca gac tca gat cca agt caa cag			3456
Pro Ser Asn Tyr Val Lys Met Thr Thr Asp Ser Asp Pro Ser Gln Gln			
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tgg tgt gct gac ctc caa gcc ctg gac aca atg cag cct acg gag agg			3504
Trp Cys Ala Asp Leu Gln Ala Leu Asp Thr Met Gln Pro Thr Glu Arg			
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aag cga cag ggc tac att cac gag ctc att cag aca gag gag cgg tac			3552
Lys Arg Gln Gly Tyr Ile His Glu Leu Ile Gln Thr Glu Glu Arg Tyr			
1170	1175	1180	
atg gac gac gac ctg cag ctg gtc atc gag gtc ttc cag aaa cggtatg			3600
Met Asp Asp Asp Leu Gln Leu Val Ile Glu Val Phe Gln Lys Arg Met			
1185	1190	1195	1200
gct gag gaa ggc ttc ctc act gaa gca gac atg gct ctg atc ttt gtg			3648

Ala Glu Glu Gly Phe Leu Thr Glu Ala Asp Met Ala Leu Ile Phe Val			
1205	1210	1215	
aac tgg aaa gag ctc atc atg tcc aac acg aag ctg ctg agg gcc ttg			3696
Asn Trp Lys Glu Leu Ile Met Ser Asn Thr Lys Leu Leu Arg Ala Leu			
1220	1225	1230	
cgg gtg agg aag aag act ggg ggt gag aag atg cca gtt cag atg att			3744
Arg Val Arg Lys Lys Thr Gly Gly Glu Lys Met Pro Val Gln Met Ile			
1235	1240	1245	
gga gac atc ctg gcg gca gag ctg tcc cac atg cag gcc tac atc cgc			3792
Gly Asp Ile Leu Ala Ala Glu Leu Ser His Met Gln Ala Tyr Ile Arg			
1250	1255	1260	
ttc tgc agc tgt cag ctt aat ggg gca acc ctg tta cag cag aag aca			3840
Phe Cys Ser Cys Gln Leu Asn Gly Ala Thr Leu Leu Gln Gln Lys Thr			
1265	1270	1275	1280
gac gag gac acg gac ttc aag gaa ttt cta aag aag ttg gca tca gac			3888
Asp Glu Asp Thr Asp Phe Lys Glu Phe Leu Lys Lys Leu Ala Ser Asp			
1285	1290	1295	
cca cga tgc aaa ggg atg ccc ctc tcc agc ttc ctg ctg aag ccc atg			3936
Pro Arg Cys Lys Gly Met Pro Leu Ser Ser Phe Leu Leu Lys Pro Met			
1300	1305	1310	
cag agg atc act cgc tac ccg ctg ctc atc cga agt atc ctg gag aac			3984
Gln Arg Ile Thr Arg Tyr Pro Leu Leu Ile Arg Ser Ile Leu Glu Asn			
1315	1320	1325	
act cca caq agt cat gtt gac cac tcc tcc ctg aag ctg gcc cta gaa			4032
Thr Pro Gln Ser His Val Asp His Ser Ser Leu Lys Leu Ala Leu Glu			
1330	1335	1340	
cgt gct gag gag ctg tgc tct cag gtg aac gag gga gtc cggt gag aag			4080
Arg Ala Glu Glu Leu Cys Ser Gln Val Asn Glu Gly Val Arg Glu Lys			
1345	1350	1355	1360
gaa aat tca gac cgg ctg gag tgg atc cag gca cac gtg cag tgc gaa			4128
Glu Asn Ser Asp Arg Leu Glu Trp Ile Gln Ala His Val Gln Cys Glu			
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ggc ttg gca gag caa ctt att ttc aac tcc ctc acc aac tgc ctg ggc			4176
Gly Leu Ala Glu Gln Leu Ile Phe Asn Ser Leu Thr Asn Cys Leu Gly			
1380	1385	1390	
ccc cgg aag ctt ctg cac agc ggg aag ctg tac aag acc aag agc aat			4224
Pro Arg Lys Leu Leu His Ser Gly Lys Leu Tyr Lys Thr Lys Ser Asn			
1395	1400	1405	
aag gag ctg cac gcc ttc ctc ttc aac gac ttc ctg ctg ctc acc tac			4272
Lys Glu Leu His Ala Phe Leu Phe Asn Asp Phe Leu Leu Leu Thr Tyr			
1410	1415	1420	
ctg gtc agg cag ttt gcc gcc tct ggc cac gag aag ctc ttc aac			4320
Leu Val Arg Gln Phe Ala Ala Ser Gly His Glu Lys Leu Phe Asn			
1425	1430	1435	1440
tcc aag tcc agt gct cag ttc cgg atg tac aaa acg ccc att ttc ctg			4368

Ser Lys Ser Ser Ala Gln Phe Arg Met Tyr Lys Thr Pro Ile Phe Leu			
1445	1450	1455	
aat gaa gtg ttg gtg aaa ctt ccc aca gac cct tcc ggc gat gag ccc			4416
Asn Glu Val Leu Val Lys Leu Pro Thr Asp Pro Ser Gly Asp Glu Pro			
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gtc ttc cac att tcc cac att gat cgt gtg tac aca ctc cga aca gac			4464
Val Phe His Ile Ser His Ile Asp Arg Val Tyr Thr Leu Arg Thr Asp			
1475	1480	1485	
aac atc aac gag agg acg gcc tgg gtc cag aag atc aag ggt gcc tca			4512
Asn Ile Asn Glu Arg Thr Ala Trp Val Gln Lys Ile Lys Gly Ala Ser			
1490	1495	1500	
gag cag tac atc gac act gag aag aag aaa cgg gaa aag gct tac caa			4560
Glu Gln Tyr Ile Asp Thr Glu Lys Lys Arg Glu Lys Ala Tyr Gln			
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gcc cgt tctcaa aag act tca ggt att ggg cgt ctg atg gtg cat gtc			4608
Ala Arg Ser Gln Lys Thr Ser Gly Ile Gly Arg Leu Met Val His Val			
1525	1530	1535	
att gaa gct aca gaa tta aaa gcc tgc aaa cca aac ggg aaa agt aat			4656
Ile Glu Ala Thr Glu Leu Lys Ala Cys Lys Pro Asn Gly Lys Ser Asn			
1540	1545	1550	
cca tac tgt gaa gtc agc atg ggc tcc caa agc tat acc acc agg acc			4704
Pro Tyr Cys Glu Val Ser Met Gly Ser Gln Ser Tyr Thr Arg Thr			
1555	1560	1565	
ctg cag gac aca cta aac ccc aag tgg aac ttc aac tgc cag ttc ttc			4752
Leu Gln Asp Thr Leu Asn Pro Lys Trp Asn Phe Asn Cys Gln Phe Phe			
1570	1575	1580	
atc aag gat ctt tac cag gac gtt ctg tgt ctc act atg ttt gac aga			4800
Ile Lys Asp Leu Tyr Gln Asp Val Leu Cys Leu Thr Met Phe Asp Arg			
1585	1590	1595	1600
gac cag ttt tct cca gat gac ttc ttg ggt cgt act gaa gtt cca gtg			4848
Asp Gln Phe Ser Pro Asp Phe Leu Gly Arg Thr Glu Val Pro Val			
1605	1610	1615	
gca aaa atc cga aca gaa cag gaa agc aaa ggc ccc acc acc cgc cga			4896
Ala Lys Ile Arg Thr Glu Gln Glu Ser Lys Gly Pro Thr Thr Arg Arg			
1620	1625	1630	
cta cta ctg cac gaa gtc ccc act gga gaa gtc tgg gtc cgc ttt gac			4944
Leu Leu Leu His Glu Val Pro Thr Gly Glu Val Trp Val Arg Phe Asp			
1635	1640	1645	
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Leu Gln Leu Phe Glu Gln Lys Thr Leu Leu			
1650	1655		

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 20 25 30
 Lys Pro Ser Gly Gly Tyr Ile Thr Gly Asp Gln Ala Arg Thr Phe Phe
 35 40 45
 Leu Gln Ser Gly Leu Pro Ala Pro Val Leu Ala Glu Ile Trp Ala Leu
 50 55 60
 Ser Asp Leu Asn Lys Asp Gly Lys Met Asp Gln Gln Glu Phe Ser Ile
 65 70 75 80
 Ala Met Lys Leu Ile Lys Leu Lys Leu Gln Gly Gln Gln Leu Pro Val
 85 90 95
 Val Leu Pro Pro Ile Met Lys Gln Pro Pro Met Phe Ser Pro Leu Ile
 100 105 110
 Ser Ala Arg Phe Gly Met Gly Ser Met Pro Asn Leu Ser Ile His Gln
 115 120 125
 Pro Leu Pro Pro Val Ala Pro Ile Ala Thr Pro Leu Ser Ser Ala Thr
 130 135 140
 Ser Gly Thr Ser Ile Pro Pro Leu Met Met Pro Ala Pro Leu Val Pro
 145 150 155 160
 Ser Val Ser Thr Ser Ser Leu Pro Asn Gly Thr Ala Ser Leu Ile Gln
 165 170 175
 Pro Leu Ser Ile Pro Tyr Ser Ser Thr Leu Pro His Ala Ser Ser
 180 185 190
 Tyr Ser Leu Met Met Gly Gly Phe Gly Gly Ala Ser Ile Gln Lys Ala
 195 200 205
 Gln Ser Leu Ile Asp Leu Gly Ser Ser Ser Ser Thr Ser Ser Thr Ala
 210 215 220
 Ser Leu Ser Gly Asn Ser Pro Lys Thr Gly Thr Ser Glu Trp Ala Val
 225 230 235 240
 Pro Gln Pro Ser Arg Leu Lys Tyr Arg Gln Lys Phe Asn Ser Leu Asp
 245 250 255
 Lys Gly Met Ser Gly Tyr Leu Ser Gly Phe Gln Ala Arg Asn Ala Leu
 260 265 270
 Leu Gln Ser Asn Leu Ser Gln Thr Gln Leu Ala Thr Ile Trp Thr Leu
 275 280 285
 Ala Asp Ile Asp Gly Asp Gly Gln Leu Lys Ala Glu Glu Phe Ile Leu
 290 295 300
 Ala Met His Leu Thr Asp Met Ala Lys Ala Gly Gln Pro Leu Pro Leu

305	310	315	320
Thr Leu Pro Pro Glu Leu Val Pro Pro Ser Phe Arg Gly Gly Lys Gln			
325	330	335	
Val Asp Ser Val Asn Gly Thr Leu Pro Ser Tyr Gln Lys Thr Gln Glu			
340	345	350	
Glu Glu Pro Gln Lys Lys Leu Pro Val Thr Phe Glu Asp Lys Arg Lys			
355	360	365	
Ala Asn Tyr Glu Arg Gly Asn Met Glu Leu Glu Lys Arg Arg Gln Val			
370	375	380	
Leu Met Glu Gln Gln Arg Glu Ala Glu Arg Lys Ala Gln Lys Glu			
385	390	395	400
Lys Glu Glu Trp Glu Arg Lys Gln Arg Glu Leu Gln Glu Gln Glu Trp			
405	410	415	
Lys Lys Gln Leu Glu Leu Glu Lys Arg Leu Glu Lys Gln Arg Glu Leu			
420	425	430	
Glu Arg Gln Arg Glu Glu Glu Arg Arg Lys Glu Ile Glu Arg Arg Glu			
435	440	445	
Ala Ala Lys Gln Glu Leu Glu Arg Gln Arg Arg Leu Glu Trp Glu Arg			
450	455	460	
Leu Arg Arg Gln Glu Leu Leu Ser Gln Lys Thr Arg Glu Gln Glu Asp			
465	470	475	480
Ile Val Arg Leu Ser Ser Arg Lys Lys Ser Leu His Leu Glu Leu Glu			
485	490	495	
Ala Val Asn Gly Lys His Gln Gln Ile Ser Gly Arg Leu Gln Asp Val			
500	505	510	
Gln Ile Arg Lys Gln Thr Gln Lys Thr Glu Leu Glu Val Leu Asp Lys			
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Lys Glu Tyr Gln Asn Lys Leu Ile Tyr Leu Val Pro Glu Lys Gln Leu			
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Leu Asn Glu Arg Ile Lys Asn Met Gln Leu Ser Asn Thr Pro Asp Ser			
565	570	575	
Gly Ile Ser Leu Leu His Lys Lys Ser Ser Glu Lys Glu Glu Leu Cys			
580	585	590	
Gln Arg Leu Lys Glu Gln Leu Asp Ala Leu Glu Lys Glu Thr Ala Ser			
595	600	605	
Lys Leu Ser Glu Met Asp Ser Phe Asn Asn Gln Leu Lys Glu Leu Arg			
610	615	620	
Glu Ser Tyr Asn Thr Gln Gln Leu Ala Leu Glu Gln Leu His Lys Ile			

625	630	635	640
Lys Arg Asp Lys Leu Lys Glu Ile Glu Arg Lys Arg Leu Glu Gln Ile			
645		650	655
Gln Lys Lys Lys Leu Glu Asp Glu Ala Ala Arg Lys Ala Lys Gln Gly			
660		665	670
Lys Glu Asn Leu Trp Arg Glu Ser Ile Arg Lys Glu Glu Glu Lys			
675		680	685
Gln Lys Arg Leu Gln Glu Glu Lys Ser Gln Asp Lys Thr Gln Glu Glu			
690		695	700
Glu Arg Lys Ala Glu Ala Lys Gln Ser Glu Thr Ala Ser Ala Leu Val			
705		710	715
Asn Tyr Arg Ala Leu Tyr Pro Phe Glu Ala Arg Asn His Asp Glu Met			
725		730	735
Ser Phe Ser Ser Gly Asp Ile Ile Gln Val Asp Glu Lys Thr Val Gly			
740		745	750
Glu Pro Gly Trp Leu Tyr Gly Ser Phe Gln Gly Lys Phe Gly Trp Phe			
755		760	765
Pro Cys Asn Tyr Val Glu Lys Val Leu Ser Ser Glu Lys Ala Leu Ser			
770		775	780
Pro Lys Lys Ala Leu Leu Pro Pro Thr Val Ser Leu Ser Ala Thr Ser			
785		790	795
Thr Ser Ser Gln Pro Pro Ala Ser Val Thr Asp Tyr His Asn Val Ser			
805		810	815
Phe Ser Asn Leu Thr Val Asn Thr Thr Trp Gln Gln Lys Ser Ala Phe			
820		825	830
Thr Arg Thr Val Ser Pro Gly Ser Val Ser Pro Ile His Gly Gln Gly			
835		840	845
Gln Ala Val Glu Asn Leu Lys Ala Gln Ala Leu Cys Ser Trp Thr Ala			
850		855	860
Lys Lys Glu Asn His Leu Asn Phe Ser Lys His Asp Val Ile Thr Val			
865		870	875
Leu Glu Gln Gln Glu Asn Trp Trp Phe Gly Glu Val His Gly Gly Arg			
885		890	895
Gly Trp Phe Pro Lys Ser Tyr Val Lys Leu Ile Pro Gly Asn Glu Val			
900		905	910
Gln Arg Gly Glu Pro Glu Ala Leu Tyr Ala Ala Val Thr Lys Lys Pro			
915		920	925
Thr Ser Thr Ala Tyr Pro Val Thr Ser Thr Ala Tyr Pro Val Gly Glu			
930		935	940
Asp Tyr Ile Ala Leu Tyr Ser Tyr Ser Ser Val Glu Pro Gly Asp Leu			

945	950	955	960
Thr Phe Thr Glu Gly Glu Glu Ile Leu Val Thr Gln Lys Asp Gly Glu			
965		970	975
Trp Trp Thr Gly Ser Ile Gly Glu Arg Thr Gly Ile Phe Pro Ser Asn			
980		985	990
Tyr Val Arg Pro Lys Asp Gln Glu Asn Phe Gly Asn Ala Ser Lys Ser			
995	1000		1005
Gly Ala Ser Asn Lys Lys Pro Glu Ile Ala Gln Val Thr Ser Ala Tyr			
1010	1015		1020
Ala Ala Ser Gly Thr Glu Gln Leu Ser Leu Ala Pro Gly Gln Leu Ile			
025	1030	1035	1040
Leu Ile Leu Lys Lys Asn Thr Ser Gly Trp Trp Gln Gly Glu Leu Gln			
1045		1050	1055
Ala Arg Gly Lys Lys Arg Gln Lys Gly Trp Phe Pro Ala Ser His Val			
1060		1065	1070
Lys Leu Leu Gly Pro Ser Ser Glu Arg Thr Met Pro Thr Phe His Ala			
1075	1080		1085
Val Cys Gln Val Ile Ala Met Tyr Asp Tyr Met Ala Asn Asn Glu Asp			
1090		1095	1100
Glu Leu Asn Phe Ser Lys Gly Gln Leu Ile Asn Val Met Asn Lys Asp			
105	1110	1115	1120
Asp Pro Asp Trp Trp Gln Gly Glu Thr Asn Gly Leu Thr Gly Leu Phe			
1125		1130	1135
Pro Ser Asn Tyr Val Lys Met Thr Thr Asp Ser Asp Pro Ser Gln Gln			
1140		1145	1150
Trp Cys Ala Asp Leu Gln Ala Leu Asp Thr Met Gln Pro Thr Glu Arg			
1155	1160	1165	
Lys Arg Gln Gly Tyr Ile His Glu Leu Ile Gln Thr Glu Glu Arg Tyr			
1170	1175	1180	
Met Asp Asp Asp Leu Gln Leu Val Ile Glu Val Phe Gln Lys Arg Met			
185	1190	1195	1200
Ala Glu Glu Gly Phe Leu Thr Glu Ala Asp Met Ala Leu Ile Phe Val			
1205	1210	1215	
Asn Trp Lys Glu Leu Ile Met Ser Asn Thr Lys Leu Leu Arg Ala Leu			
1220	1225	1230	
Arg Val Arg Lys Lys Thr Gly Gly Glu Lys Met Pro Val Gln Met Ile			
1235	1240	1245	
Gly Asp Ile Leu Ala Ala Glu Leu Ser His Met Gln Ala Tyr Ile Arg			
1250	1255	1260	
Phe Cys Ser Cys Gln Leu Asn Gly Ala Thr Leu Leu Gln Gln Lys Thr			

265	1270	1275	1280	
Asp Glu Asp Thr Asp Phe Lys Glu Phe Leu Lys Lys Leu Ala Ser Asp				
	1285	1290	1295	
Pro Arg Cys Lys Gly Met Pro Leu Ser Ser Phe Leu Leu Lys Pro Met				
	1300	1305	1310	
Gln Arg Ile Thr Arg Tyr Pro Leu Leu Ile Arg Ser Ile Leu Glu Asn				
	1315	1320	1325	
Thr Pro Gln Ser His Val Asp His Ser Ser Leu Lys Leu Ala Leu Glu				
	1330	1335	1340	
Arg Ala Glu Glu Leu Cys Ser Gln Val Asn Glu Gly Val Arg Glu Lys				
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Glu Asn Ser Asp Arg Leu Glu Trp Ile Gln Ala His Val Gln Cys Glu				
	1365	1370	1375	
Gly Leu Ala Glu Gln Leu Ile Phe Asn Ser Leu Thr Asn Cys Leu Gly				
	1380	1385	1390	
Pro Arg Lys Leu Leu His Ser Gly Lys Leu Tyr Lys Thr Lys Ser Asn				
	1395	1400	1405	
Lys Glu Leu His Ala Phe Leu Phe Asn Asp Phe Leu Leu Leu Thr Tyr				
	1410	1415	1420	
Leu Val Arg Gln Phe Ala Ala Ala Ser Gly His Glu Lys Leu Phe Asn				
	425	1430	1435	1440
Ser Lys Ser Ser Ala Gln Phe Arg Met Tyr Lys Thr Pro Ile Phe Leu				
	1445	1450	1455	
Asn Glu Val Leu Val Lys Leu Pro Thr Asp Pro Ser Gly Asp Glu Pro				
	1460	1465	1470	
Val Phe His Ile Ser His Ile Asp Arg Val Tyr Thr Leu Arg Thr Asp				
	1475	1480	1485	
Asn Ile Asn Glu Arg Thr Ala Trp Val Gln Lys Ile Lys Gly Ala Ser				
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Glu Gln Tyr Ile Asp Thr Glu Lys Lys Lys Arg Glu Lys Ala Tyr Gln				
	505	1510	1515	1520
Ala Arg Ser Gln Lys Thr Ser Gly Ile Gly Arg Leu Met Val His Val				
	1525	1530	1535	
Ile Glu Ala Thr Glu Leu Lys Ala Cys Lys Pro Asn Gly Lys Ser Asn				
	1540	1545	1550	
Pro Tyr Cys Glu Val Ser Met Gly Ser Gln Ser Tyr Thr Thr Arg Thr				
	1555	1560	1565	
Leu Gln Asp Thr Leu Asn Pro Lys Trp Asn Phe Asn Cys Gln Phe Phe				
	1570	1575	1580	
Ile Lys Asp Leu Tyr Gln Asp Val Leu Cys Leu Thr Met Phe Asp Arg				

585	1590	1595	1600
Asp Gln Phe Ser Pro Asp Asp Phe Leu Gly Arg Thr Glu Val Pro Val			
	1605	1610	1615
Ala Lys Ile Arg Thr Glu Gln Glu Ser Lys Gly Pro Thr Thr Arg Arg			
	1620	1625	1630
Leu Leu Leu His Glu Val Pro Thr Gly Glu Val Trp Val Arg Phe Asp			
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Leu Gln Leu Phe Glu Gln Lys Thr Leu Leu			
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<212> DNA
<213> Artificial Sequence
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<223> Description of Artificial Sequence:primer

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<212> DNA
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<220>
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<210> 30
<211> 21
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Description of Artificial Sequence:primer

<400> 30
agctccccctg gttctggctt c 21

```
<210> 31
<211> 51
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Description of Artificial Sequence:primer

<400> 31

gaattcagaa ccatggaaca aaagcttatt tctgaagaag acttggggcc c 51

<210> 32
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

<400> 32
cctggattac aaggatgatg atgacaaatg actcgag 37

<210> 33
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:peptide

<400> 33
Met Ala Gln Phe Pro Thr Pro Phe Gly Gly Ser Leu Asp Val Trp Ala
1 5 10 15
Ile Thr Val Glu Glu
20